

NOTE.—The Application for a Patent has become void.

This print shows the Specification as it became open to public inspection.

## PATENT SPECIFICATION



Convention Date (France): Nov. 26, 1925.

262,045

Application Date (In United Kingdom): July 7, 1926. No. 16,593 / 28.

Complete not Accepted.

### COMPLETE SPECIFICATION.

#### Electric Water-level Indicator.

I, PIERRE PAIRARD, a citizen of the French Republic, of 94, rue Saint-Lazare, Paris, France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to an electric water-level indicator applicable in all cases in which it is necessary to read or to turn to account the variations of the level of the water in any enclosure, but particularly intended for high pressure steam boilers, on which it becomes more and more difficult to apply glass tubes permitting direct reading.

This apparatus, which can be fitted on any steam boiler whatever may be its pressure, is characterised by the combination of visual indicators, such as lamps, with a series of contacts vertically arranged in an enclosure in communication with the boiler and placed on electric circuits feeding these indicators, so that a current passes through the latter when the contact which corresponds thereto is touched by the water; this arrangement can be completed by an electromagnetic mechanism the energization circuits of which are controlled by the contacts and which acts for automatically ensuring the operation of the valve feeding the boiler in function of the level of the water in the latter.

The accompanying drawing illustrates, somewhat diagrammatically, and by way of example only, a form of construction of an apparatus such as above characterised.

Fig. 1 is a view of the entire apparatus in partial vertical section.

Fig. 2 is a horizontal section of the enclosure containing the contacts for a constructional modification.

The apparatus illustrated in the drawing comprises a vessel or enclosure 1 devised for replacing, on a boiler, a water level permitting a direct reading. For that purpose, the vessel 1 is connected at

each of its ends to a short tube 2 connected in its turn in a fluid-tight manner to the boiler 3 with which the communication can be established or interrupted by means of suitable cocks 4. A relief cock is also provided at 5.

This vessel 1 is entirely made of metal so as to provide a fluid-tight enclosure devised, of course, for resisting to the pressures of the boiler. Contacts constituted for instance by means of rods 6 carrying a series of parallel discs 7 are arranged within the enclosure 1 and regularly distributed throughout the height of the latter.

The contacts 6 are carefully insulated from the mass and for that purpose can be constituted by the central electrode of sparking plugs substantially similar to the sparking plugs used for ignition purposes in combustion engines. These sparking plugs are screwed by their cap 8 and lock themselves in a fluid-tight manner on the walls of the vessel 1 provided with screw-threaded holes. Of course, these sparking plugs can be replaced by any equivalent device, without departing from the scope of the invention. A source of electric current can feed as many circuits as contacts 6, the circuit of each contact comprising, connected in series:

A pole of the source 9, the body of the vessel 1, the water contained in this latter, a contact 6, an indicator (lamp 10) and the other pole of the source 9.

It will be seen that the lamp 10 of a circuit corresponding to a contact 6 touched by the water of the vessel 1, is in circuit and consequently lighted, whilst the lamps the corresponding contact of which does not touch the water of the vessel are extinguished.

By distributing the contacts 6 along the column of the level, so that they are separated by somewhat reduced spaces, the variations of the level in the column can be followed in a sufficiently precise manner according to the number of lamps

50

55

60

65

70

75

80

85

90

95

lighted. A solenoid 11 can be connected in shunt on each lamp circuit, all the solenoids being arranged on one and the same axis so as to receive a movable armature or core 12 coupled to any suitable mechanism for controlling the valve feeding water to the boiler. In the example diagrammatically illustrated in Fig. 1 of the accompanying drawing, it will be seen that when the level of the water has fallen below a predetermined point, the core 12 is lowered by acting on the lever 13 for unsticking the valve 14 which controls the admission of water. This valve is automatically stuck on its seat when the level has sufficiently risen.

The distribution of the contacts 6 on the vessel 1 can be made in any suitable manner. If it is desired that the contacts should be very near each other, they can be alternately placed at two opposite regions of the vessel 1, as shown for instance in Fig. 2. In this figure, the indicators or lamps 10 are placed on a board 15 directly secured on the vessel 1.

It is to be understood that the electrical operation of the level indicator which has just been described, allows independently of the indication of the level on the boiler itself, to transfer, by a wire circuit, these same indications in any other premises, and, for instance, in the office of the chief of the boiler room who can thus supervise at a distance the variations of the level of each of the elements of the boiler room.

The source of current used does not constitute a feature of the invention and can be of an extremely variable nature. The current supplied by a central station with a transformer if necessary, can be used. Use can also be made of storage batteries or of a small motor generating set, etc.

It will be seen that the level indicator described can be devised for replacing ordinary water level tubes, without necessitating any modification of the plant already existing on the boiler.

It is obvious that the invention is not limited to the visual control of the level of water in boilers, and that it can be applied to the electrical control of any apparatus adapted to work in synchronism with the variations of the level of the water in any tank. It will be in fact understood that it is easy to replace the

lamps 10 by relays the energization of which puts in action various apparatus, such as feed pumps for instance.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Electric water level indicator more particularly intended for high pressure steam boilers, characterised by the combination of visual indicators, such as lamps, with a series of contacts vertically arranged in an enclosure in communication with the boiler, and placed in electric circuits feeding these indicators, so that a current passes through the latter when the contact corresponding thereto is touched by the water; this arrangement can be completed by an electromagnetic mechanism the energization circuits of which are controlled by the contacts and which acts for automatically ensuring the operation of the feed valve of the boiler in function of the level of the water in the latter.

2. Water level indicator as claimed in Claim 1, characterised in that each contact is constituted by the central electrode of a sparking plug substantially similar to the sparking plugs of combustion engines, and screwed in a fluid-tight manner in a screw threaded hole of the wall of a level tube or of the boiler, each contact being placed on a circuit comprising: a pole of a source of current, the body of the level tube, the water of the latter, the contact, a visual indicator constituted by a lamp, and the other pole of the source.

3. Water level indicator, as claimed in Claims 1 and 2, characterised in that on each of the circuits of contacts is connected in shunt a solenoid which energizes when the contact to which it corresponds is closed by the water of the tube, the whole of the solenoids constituting a winding within which can move an armature or core coupled to a mechanism actuating the valve which controls the feeding of water to the boiler.

4. The electric water level indicator, substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 1st day of June, 1926.

MARKS & CLERK.

